FOR MYSORE STATE

Dept (1952) Department.

Ms SERIES.

G.O. NO. 3074

Dated 18-7-52

Passed
Kas

[Despatch Abstract.]

GSI – Report entitled "The Geology And Mineral Investigation of Sandur, Hospet and Kudligi taluks Bellary District" by Sri M. Krishnaswamy Asst Geologist – Recorded.

No R64 -M/398(10)MKM/50-51 Calcutta 13, the 27th June, 195:

FROM

THE DEPUTY DIRECTOR,
GEOLOGICAL SURVEY OF INDIA,
27, Chowringhee,

To

The Secretary to the Govt. of
Madras,
Development Department,
Fort St. George, Madras.

Sir,

I am forwarding herewith 3 copy of the following report for your information and record.

Kindly acknowledge receipt.

72433

Yours faithfully,

P. Chatterjee

for *Deputy Director,*
Geological Survey of India.

Title of the report :

"Progress report for the field season 1950-51, the geology and mineral investigation of the Sandur, Hospet and Kudligi Taluks, Bellary District, Madras State" by Mr. M.Krishnamurthy, Asst.Geologist, G.S.I.

Dept (J) Dept

Pl. Issue Letter 72438 J/52 - 1 dated 1.7.52

5/7/52 for 1.7.52 To

The Dy. Director, G.S.I.,
27, Chowringhee,
Calcutta. 13.

Sir,

Sub: Mines - G.S.I. report entitled "Progress Report for the field season 1950-51 the geology and mineral investigation of the Sandur, Hospet and Kudligi talukas, Bellary dt." by Mr. M. Krishnan - Acknowledgement of.

Ref: your letter 7264 - M(398)(10) MKN/50-51 dated 27/5/52

I am directed to acknowledge the receipt of three copies of the G.S.I. report sent with your letter cited.

for 1.7.52 1.7.52

1.7.52

Development (J) DEPT

Sub: G.S.I. REPORT entitled "The Geology Mineral Investigation of the Sandur Hospet and Kudligi taluks, Bellary by Sri M.Krishnaswamy, Asst.Geologi Recorded.

Ref: From the Dy.Director, G.S.I.Lr.726 M/398(10) MKM/50-51 d/27/6/52.

G.O(MS)NO. 3074 Dated 8-7-19

Recorded.

To
The D.I& C. (with a report (K).
The Superintending Geologist,
Southern Circle, Madras.

Development(MINES)DEPT.

Sub: GEOLOGICAL Survey of India entitled "The Geology and Mineral Investigation of the Sandur, Hospet and Kuddigi Taluks, Bellary district, Madras State"

Ref: From the Dy.Director, G.S.I. Lr.7264-M/398 (10) MKM/50-51 d/27/6/52.

To A.S

The G.S.I. report entitled "The Geology and Mineral Investigation of the Sandur, Hospet and Kudligi taluks, Bellary district" is noted on below.

2/ This report relates to the Systematic mapping and mineral investigation ~~were undertaken~~ in an area of 350 sq.miles forming parts of Hospet, Kudligi and Sandur Taluks in Bellary district. The area is gently sloping towards Tungabadra river, being dotted with small groups of hills. The two important rivers that serve as drainage sources are Nani Halla and Chinna Hagari. The climate is dry and the rainfall is scanty.

The geological formations noticed are given below.

ARCHAEANS	Recent and sub-recent	Recent and sub-recent soils, superficial laterite and alluvium
		Dolerites
		Pink granites and Pegmatites(equivalent of Closepet granites)
		Biotite and hornblende-gneisses and other schistose gneisses(equivalen of Peninsular gneisses)
	Dharwars	Basic lava flows (trap), banded ferruginous quartzites, enriched phyllites with iron and manganese-ore, hornblende-schists, tremolite and actionlite-schists.

The distribution, the structure and the qualities of the formation are dealt with in detail from pp.3-7 of (K).

3. The ~~only~~ economic minerals found in the area are ~~concretions of~~ manganese ore and clay. The only workable deposit of manganese ore is being mined by Godfrey Bros. of Bombay. Small test pits to determine the resources and nature of the clay proved that the deposits are not extensive.

/P.T.O.

2

4. The report does not contain any important or useful information except for the results of the analysis of the manganese ores given therein. (It does not seem necessary to publish this report.) This may, therefore, be recorded. A draft order is submitted for approval.

16/7/52 17-7-52

17752 15 | 18/7

GEOLOGICAL SURVEY OF INDIA

PROGRESS REPORT FOR THE FIELD-SEASON 1950-51

THE GEOLOGY AND MINERAL INVESTIGATION OF THE SANDUR, HOSPET AND KUDLIGI TALUKS, BELLARY DISTRICT, MADRAS STATE

M. KRISHNAMURTY.
Assistant Geologist, Geological Survey of India.

May. 1952.

Progress Report for the Field-season 1950-51

THE GEOLOGY AND MINERAL INVESTIGATION OF THE SANDUR, HOSPET AND KUDLIGI TALUKS, BELLARY DISTRICT, MADRAS STATE

By

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Progress Report for the Field-season 1950-51

THE GEOLOGY AND MINERAL INVESTIGATION OF THE SANDUR, HOSPET AND KUDLIGI TALUKS, BELLARY DISTRICT, MADRAS STATE

By

M. Krishnamurty, M.Sc.,
Assistant Geologist, Geological Survey of India.

INTRODUCTION

In accordance with the field-season programme for the year 1950-51, I left for field work on the 29th of November, 1950, to commence systematic geological mapping and mineral investigation of Bellary district, where I worked till the end of the season and returned to head-quarters at Madras on the 5th of May, 1951.

During this period an area of 350 square miles, within latitudes 14°35' : 15°15' and longitudes 76°30' : 76°45' in topo-sheets No. 57 B/9 and 10 and A/12, in Hospet, Kudligi and Sandur taluks, Bellary district, was covered.

Previous work

The earliest references to the geology of the Bellary district were made briefly by Captain W. Cullen and Captain T.J. Newbold.

A short account of the geology of the district was given by R.B. Foote in the Memoir 'On the Geological features of the Southern Maharatta country and adjoining districts' (Mem.Geol.Surv.Ind., Vol. XII, pt. 1, 1876). Subsequently he published the results of his systematic work in the district under the caption 'Geology of Bellary district' (Mem.Geol.Surv.Ind., Vol. XXV, 1895).

Mr. A. Ghose, in his valuable paper on the manganese-ore deposits of the Sandur State had given a brief description of the geological formations in the State (Trans.Min.Geol.Inst.Ind., Vol. V, pt. 3, 1910).

The latest work on the geology and mineral resources of the Sandur State, with particular reference to its industrial development, was by Messrs. M.S. Venkatram and N.V.B.S. Dutt, published in G.O. No. 2441, 7th May, 1949, Development Department, Madras.

II. PHYSICAL FEATURES

Relief

Sandur hills which run across the middle of the district from north-west to south-east divides the district into two natural divisions, one eastern and the other western. Both these divisions slope imperceptibly towards Tungabhadra river. Besides these main ranges in the area, there are smaller detached groups of hills, one commencing from Papanayakanhalli and extending upto Daroji and the other Gudekota range of hills stretching in a S.S.E. direction to the valley of the Chinna Hagari river. They are continuous with the eastern Rayadrug cluster of hills intervened by an enclave of Mysore State. The Copper Mountains start from the south end of the Daroji tank.

The area with basic rocks bears black cotton soil while the granitic terrain shows red loamy type.

Drainage

Nari Halla and Chinna Hagari are the only two important rivers that furnish water for irrigation purposes in the area, besides the small streams. After being dammed up to form the Daroji tank, Nari Halla flows through the Sandur valley by the Obalagundi and Bhimagundi gorges, into Tungabhadra by nearly northerly course. Chinna Hagari, a tributary of Hagari river flows along the eastern margin of Kudligi taluk into the Mysore State.

Daroji and Avanimadugu tanks are of considerable size and do not dry up even in summer.

Climate

The district is remarkably dry, for, though it is subject to both the monsoons, it gets the full force of neither. The greater supply of rain is given by the south-west monsoon from June to October. From October to March the north-east monsoon brings a little precipitation. The cold weather begins from November and lasts till the end of February. The average rainfall varies from 15 inches to 20 inches annually. Around Sandur, Bellary and Hospet, the temperature is generally moderate. For nine months in the year the district enjoys a bracing climate but in the hot summer months from April to June, the minimum and maximum temperatures vary between 90° and 103°F. In the cold season, the temperature falls down to 55°F. during nights.

In view of the dryness of the district, famines and epidemics are of common occurrence.

Communications

Bellary and Hospet towns are well served by roads and railways. The metre gauge line from Guntakal to Hubli passes through Bellary, Gadiganuru and Hospet. Another branch line running between Hospet and Swamihalli is mainly for the transport of the manganese-ore worked by the General Sandur Mining Co.,Ltd. When the streams are full, traffic is suspended on this line. Sandur is connected by a road to Kudligi on one hand and to the rail-head at Toranagallu on the other. Inter-village communications are only by cart-tracts which are in a bad condition.

III. GEOLOGICAL FORMATIONS

The probable sequence of the formations met with in the area is as follows:-

	Recent and Sub-recent	Recent and sub-recent soils, superficial laterite and alluvium
ARCHAEANS		Dolerites
		Pink granites and pegmatites (equivalent of Closepet granites)
		Biotite- and hornblende-gneisses and other schistose gneisses (equivalent of Peninsular gneisses)
	Dharwars	Basic lava flows (trap), banded ferruginous quartzites, phyllites with iron- and manganese-ore, hornblende-schists, tremolite- and actinolite-schists

enriched

Hornblende-schists, etc.-Hornblende-schists, tremolite- and actinolite-schists are developed in force in the hills north of Joga and in the Toranagallu reserve forest. Caught up lenses of these are also noticed in the granitic gneisses east of Kodal, north of Gadiganur and around Malapuram. They give rise to black to coffee-brown soils. The hornblende-schists in places have become compacted and crumpled into small tabloids called trappoids by Bruce Foote. The rocks show a remarkable conformity with the overlying sedimentaries.

Under the microscope, the hornblende-schists in general, show bluish green hornblende, granular quartz and orthoclase. Acid plagioclases and biotite occur in subordinate amounts. Chloritisation of hornblende and sericitisation of felspars are quite common. Biotite in some sections shows pleochroic haloes. The dark coloured, compact black bands caught up in the granitoids both in the Toranagallu and Kurikuppi hills were considered to be diorites by Bruce Foote, but microscopic examination of sections of these rocks shows them to be compact hornblend schists with granitic admixtures.

The blackish grey hornblende-schists are sufficiently tough and massive to be classed as greenstones in the field. A microsection of the rock shows chlorite, fine-grained interstitial quartz and orthoclase. A few pieces of hornblende partly chloritised are also present. Magnetite is accessory.

Phyllites, ferruginous shales, quartzites etc., are well developed in the hills around Joga, Toranagallu reserve forest and on the southern spurs of the Sandur range. All these occur as bands alternating conformably both among themselves and with the trap rocks. They have a general W.N.W.-E.S.E. strike dipping 60-70° southerly.

Phyllites.-The phyllites are often massive and are locally granitised. Bruce Foote originally designated them as schists. Micaceous phyllites have also been noticed west of Kodal. The rocks are manganiferous and also haematitic in some places. Argillites are developed between 14 and 16 milestones on Kanevehalli-Swamihalli metre-gauge line. They are traversed irregularly by vein quartz and pegmatite. Red ochreous material is seen amidst their laminations. It is generally noticed that the ferruginous shales on the top of hill become phyllitic at lower levels. In the area south and east of the Sandur ranges, the strata thin out.

Associated with the phyllites is seen a thick bed of breccia(?) south of .2919 hill and the .2552 hill W.S.W. of Joga. This contains pebbles of quartz in varying sizes (1½" x ½"; 4" x ¼"; 2" x 1"), in a matrix of red ochreous shales or fine silky green phyllite.

Ferruginous quartzites.-The ferruginous quartzites are poorly banded and are low in iron-content. They are usually associated with phyllites or red ochreous shales. The individual layers in these quartzites show minor puckerings and folds. The central band on the top of the .2919 hill W.S.W. of Joga and another thin band (50 feet) on the .2090 hill in the Toranagallu reserve forest are haematitic. A microsection of this rock reveals firmly interlocking grains of quartz in dark coloured compact haematite.

Thin bands of magnetite-quartzite have also been noticed in the following localities associated with trap rocks:-

(a) one mile west of Madukulakatte adjoining the Gundumanugu tank and
(b) two furlongs west of Hudem.

A section of the rock collected from the latter locality is medium-grained and consists of quartz with brushed extinction, magnetite, garnet and hornblende. Biotite is present in subordinate amounts. It is interesting to note that magnetite and garnet have intergrown around green hornblende, which shows alteration to biotite. Garnets are rounded and granular and with inconspicuous cracks. Apatite is accessory

Quartzites.-The quartzites occur (1) ½ mile east of Pujarihalli, (2) ¾ mile east of Lokikere, (3) the prominent hill in the Jummanobanahalli reserve forest and (4) three furlongs N.N.E. of Jummanobanahalli.

They are massive, well jointed and show under the microscope finely interlocked grains of quartz showing undulose extinction and a few grains of biotite. The vein quartz in the hills east of Lokikere grades to a quartzite due to subsequent strain and pressure to which the Dharwars have been subjected.

Basic lava flows.-Basic lava flows consisting chiefly of coarse to medium grained doleritic types occur in the hills around Joga, Nagalapuram, Kodal and east of Antapuram. They are compact, massive and brownish black in colour and of variable texture as seen in the .2200 hill one mile E.N.E. of Nagalapuram. In outcrops they are highly jointed giving rise to boulders which are strewn pell-mell. West of Kodal, the trap encloses thin bands and lenses of phyllites, tremolite-schists etc. They are traversed here and there by vein quartz. In the Sandur hill extensions, south of Joga, these rocks alternate with phyllites and ferruginous quartzites and support luxuriant growth of grass fodder, which the Military Grass Farm at Toranagallu, despatch to Bangalore and Secunderabad in considerable quantities. On the south-eastern and south-western flanks of the Sandur hills, the traps intervene between the sediments and granite gneisses. Pinched out and truncated magnetite-quartzite bands are also noted in the Ubbalagandi and Ayinahalli reserve forest hills...

These rocks are composed mainly of augite and plagioclase, the two having sub-ophitic relationship. The felspars are generally altered to various degrees; the alteration products being sericite, zoisite etc. A few grains of interstitial quartz are present. Chloritisation of pyroxenes mostly along their margins is also common. Augite in some sections shows twinning.

The phyllites become spotted and porphyritic at their contact with the lava flows. They show in ground mass fine grained orthoclase, secondary calcite and biotite with pleochroic haloes. The phenocrysts consist of lath-shaped actinolitic hornblende bordered by and enclosing pieces of calcite and magnetite. Interstitial quartz and orthoclase are present. In the hills west of Kodal, the lava flows are altered to

actinolite schists. Megascopically the rocks are dark coloured massive, hard, showing fine needles of actinolite. Their contact with the granite is sharp and shows under the microscope effects of chilling. The minerals at the contact have become fine-grained and mica is developed at the expense of hornblende. Complete sericitisation of felspars is also common in such contact rocks.

The section of a trap rock from Agasaladibbadahalli looks more like a diabase than a dolerite. It is with difficulty that the pyroxenes could be identified and the plagioclases have been crushed, generally along their twin planes. Chloritisation of the pyroxenes and sericitisation of the felspars are well seen.

Biotite-gneisses and other schistose gneisses (equivalent of Peninsular gneisses).-Three types of granitoids could be distinguished in the area based mostly on physical characters and mineralogical variation. They are:-

(a) A medium-grained light grey granitoid of Gudekota.
(b) A coarse-grained light coloured granite-gneiss with porphyritic crystals of felspar as around Gadiganuru and Toranagallu.
(c) Biotite-gneiss with schistose admixtures as in Appiyanahalli reserve forest.

(a) Biotite-gneisses with schistose admixtures.- These are coarse-grained, imperfectly banded and enclose biotite- and at times hornblende-schists and trap rocks, which represent portions of the pinched out parent masses engulfed in the invading granite magma. Biotite-gneisses with hornblende-schist inclusions are noticed in Marutla and Ubbalagandi reserve forest, hills north of Gadiganuru, Choranur R.F. hills and around Tonasigeri. Caught up traps are noticed in the granite hill east of Kodal, hills north of Dharmasagaram, top of the hill near the 341 milestone on Hospet-Bellary road etc. In these rocks the quartz is vitreous and the felspars range in composition between albite and oligoclase with varying proportions of orthoclase. Microcline is also seen in some sections. Felspars are usually kaolinised. The ferromagnesian minerals are biotite and hornblende decomposed into chlorite. Apatite is accessory.

(b) Coarse-grained granite gneisses with porphyritic crystals.-Porphyritic granitoids are massive, coarse-grained rocks with porphyritic crystals of orthoclase of various sizes and shapes. The crystals vary in size from 1½" x ½" to 2" x ¾"; a few are 2" x 1½". Thin felspathic bands and veins of quartz traverse the gneisses. Porphyritic granitoid is prominently developed on the southern and western margins of the conical hill adjoining Toranagallu. On the top of the hill, the rock is less porphyritic and more fine-grained. The larger axes of the felspar crystals are arranged in two directions mostly at right angles to each other. The rock is conspicuously porphyritic near its contact with pegmatites as in the steep hills N.N.E. of Gadiganur. Porphyritic granites which are developed in force here are absent in other areas.

Under the microscope, the section of a porphyritic granite shows the porphyritic crystals of sericitised plagioclases of albite-oligoclase composition set in a fine-grained matrix consisting of quartz,

orthoclase, microcline and a few plagioclase grains. Secondary biotite is also noted.

(c) Light grey granitoids.-These rocks are well developed around Gudekota, Shelliyappanhalli and Gollalingamanahalli. The Gudekota range of hills are high and very rugged. The rocks consist of coarse-grained grey to bluish granitoids which weather into large blocks, 20 to 30 feet across. They often show vertical jointings which give rise to mural scarps. They also enclose bands of trap rock and are traversed by pink pegmatite.

The granitoids around Gollalingamanahalli are light grey in colour, coarse-grained and traversed irregularly by coarse pegmatite. East of the village, close to the southern end of the Sandur range, the granitoids form a smooth 'inclined plane' amidst trap rocks, which is clearly visible from a distance, but not apparent from close quarters. R. Bruce Foote referred to this inclined plane while discussing the geology of the Bellary district.

Pink granites and pegmatites.-These rocks occur 1-1½ miles north-west of Kurikuppi and in Gudekota near Molakalamur. The pink pegmatites traverse the gneisses irregularly in many places. They are well jointed with large detached boulders scattered in a pell-mell fashion. On weathered surfaces, they present a reddish appearance which is not apparent in freshly broken specimens. Under the microscope, the rocks show kaolinised acid plagioclases in predominance, besides quartz and orthoclase. Strain phenomena like brushed extinction, bending of twin places, simulation of cross-hatching are common. Sericitisation of felspars in these rocks is considerably less than in porphyritic varieties. Accessories like sphene and apatite are less common than in the ordinary biotite-granite-gneisses.

Dolerites and dolerite-porphyry.-Dolerites occur as long dykes in the granites and the older basic rocks and due to their resistance to weathering, stand out above the granite plain as long walls of various heights. They are of considerable width, about 70 to 100 feet, and persist for several miles in a W.N.W.-E.S.E. strike direction with a southerly dip of 70 to 80°. Such dykes are noticed in the following places:-

(a) Avanimadugu dyke.-A long dyke, running for a distance of about 6 miles is seen between Avanimadugu-Bannihatti and Joga, forming a high and conspicuous crest wall above the granites and basic igneous rocks.

(b) Another dyke extends for a distance of 5-6 miles, amidst micaceous granitoids, from Buddenahalli to Shelliyappanahalli, before entering the Mysore State.

(c) The third one is noted between Nallabanda-Ramadurgam and Srikantapuram stretching discontinuously for a distance of about seven miles.

A few other dykes run discordantly as at Bommenahalli and Devarahalli.

The dolerites are variable in texture from fine-grained to medium and coarse-grained varieties. The principal minerals are augite and labradorite, normally showing sub-ophitic texture. Some interstitial quartz is usually seen. Uralitisation of pyroxenes and saussuritisation of felspars are common. Micro-pegmatite is

generally found. The contact of these bodies with the granite is sharp showing chilling effects and development of calcite under the microscope.

Some dykes are porphyritic with laths of green felspar in a blackish green matrix. Such a dolerite-porphyry runs discontinuously for a distance of six miles from Huralihalu and crosses the Chinna Hagari river near Minekere. One mile west of Huralihalu, two more dolerite dykes join the main band and all disappear imperceptibly under the cover of red soil. In a micro-section of this dolerite-porphyry it is observed that the pyroxenes are uralitised and the felspars are sericitised. They are so sheared that the ophitic texture is mostly obliterated. Released quartz grains and magnetite dust are noted around pyroxenes.

Two miles north-east of Huralihalu on the Sangalapuram-2027 cart tract, is seen a thin band of olivine-dolerite which joins the main band south-westward. Under the microscope, the minerals composing this rock do not show much alteration. The rock consists of titaniferous augite, fresh lath-shaped crystals of felspar and olivine with cracks filled in by magnetite. This is the only locality where olivine is recorded in a dolerite.

Recent and sub-recent formations.-Laterite is a constant associate of the phyllites in which manganese and iron-ores are developed. It forms a thick covering of about five to 15 feet over the ore bodies. Generally the granitic terrain bears red soil, while in the areas covered by dolerites and along the river courses, the black cotton soil is prevalent. The former soil supports dry crops like maize and groundnuts, while the latter, paddy, wheat, onions and sugarcare, etc.

IV. ECONOMIC GEOLOGY

Apart from building stones and road metal, the only other economic materials found in the area mapped are some quantities of manganese-ore and clay.

Manganese-ore

Thin irregular bodies, lenses and nodules of manganese-ore occur associated with lateritoid-haematite in the phyllites. The ores grade imperceptibly into the underlying phyllites indicating that the deposits were formed by replacement of phyllites by manganiferous solutions.

The only workable deposit of manganese-ore noted in the area, is in the southern spur of the Sandur range, four miles west of Swamihalli. Some years back, one Mr. Lalan of Bombay attempted to work the deposit. He had put a small tram line to carry the ores to the railway siding. As the deposit could not be worked at a profit, it was abandoned. Recently, one Mr. Gadigu Chennappa of Bellary took lease of the area and Godfrey Brothers from Bombay have resumed mining the ores on his behalf.

Manganese-ore is worked in this area by open-cut methods. Sorting and grading of the ores are done by manual labour. The ores are carried from the quarries to the railway siding by trucks. Thirty tons of unsorted ore are mined daily from this area. Mormugao is the nearest harbour to which ores are transported by railways for shipment, mostly to the United Kingdom.

The ores are an irregular mixture of pyrolusite, psilomelane and wad, showing sudden variations from place to place in the field.

Fairly representative samples of ores collected were analysed in the Geological Survey of India Laboratory, with the results shown below:-

Sample No.	SiO_2 %	Fe_2O_3 %	P. %	Total Mn. %
A-214-M	1.20	17.6	0.01	44.93
A-217-M	2.20	18.8	0.019	40.55
A-215-M	1.80	22.01	0.015	39.90
A-216-M	5.30	17.20	0.023	38.82

Clays

Small occurrences of white, buff and purple clays are noted 2½ miles S.S.W. of Joga and their suitability for industrial purposes is being tested in the Geological Survey of India Laboratories.

Small test pits of different sizes (4' x 3' x 3'; 6' x 4' x 2' etc.) have been put here by Mr. Gangatharappa of Kakabalu village. Gritty clays of varying colour have also been recorded around Swamihalli, in the nala sections and hill cuttings. These clays are the weathered products of the phyllites and shales. The deposits, however, are not extensive.

Kankar

Kankar occurs as a superficial deposit in the schistose gneisses, varying in thickness from one foot to six feet. Lime or 'chunnam' for building purposes is made by burning kankar occurring around Srikantapuram and one mile north of Tokkanahalli (14°52'15" : 76°35'0").

Iron slag

The occurrence of iron slag in many places indicates iron smelting activities in the area in the past.

Building stones and Road metal

The area abounds in good building stones and road metal. The grey granitoids of Gudekota and the hard granitic gneisses present in various parts of the area could be used for building purposes. The former rocks yield large slabs and blocks suitable for pillars, lamp posts, pavement stones and fencing purposes. The dolerites which occur extensively in the area, could be used as road metal. These rocks not only could withstand the heavy traffic strain, but do not also give rise to much dust. But they are seldom used as a road metal in the area. The dolerite-porphyry found near Huralihalu, can be used for decorative purposes due to the pleasing green colour of its porphyritic felspar laths, on the polished surfaces.

V. WATER SUPPLY

The wells situated in schistose rocks and jointed granitoids yield copious supply of water at comparatively shallow depths around Gadiganuru and Toranagallu. Even in these areas wells are few and far between; the cultivator has to depend upon rains for agricultural purposes. But in the basic igneous rocks the water table is very deep from the surface as in Joga and Swamihalli. In these villages and Nagavanahalli, hamlet of Tonasigeri, there is acute scarcity of water. Here step wells used for drinking water purposes, are contaminated with guineaworm

The following are some of the suggestions for the improvement of the water supply in the area:-

1. Old wells should be renovated and suitably lined to avoid contamination from outside.

2. Jointed rocks and those cut by basic dykes and pegmatites usually yield large supply of water.

3. Nari Halla and Chinna Hagari may be dammed at suitable places for storage of water for agricultural purposes.

4. Rain water may be stored suitably for use in dry season.

Places with their geographical index are given in the Appendix.

VI. ACKNOWLEDGMENTS

I am thankful to Dr. A.K. Dey, Superintending Geologist, Geological Survey of India, Southern Circle for his guidance in the execution of this work. My thanks are also due to the District Collector and the other Revenue Officials of the Bellary district, for the constant help received from them during my field work in the area.

PPN

APPENDIX

Index to localities

Name of the village.	Sheet No.	Latitude o ' "	Longitude o ' "	Depth of water level in feet.
Appayinahalli	57 B/9	14 51 30	76 41 15	30-35
Bommagatla	"	14 56	76 34	15
Choranur	"	14 55	76 32	20-30
Devarahalli	"	14 55 30	76 39	30-35
Dharmasagaram	57 A/12	15 14	76 34	20-25
Gadiganuru	"	15 13	76 36	15-20
Gundlavaddigeri	"	15 14	76 31	25
Gudekota	57 B/9	14 50	76 38	30
Gundumanugu	57 B/10	14 43	76 31	10-15
Huralihalu	"	14 43	76 33 15	30
Hudem	"	14 37 40	76 30 0	10-20
Joga	57 A/12	15 11	76 33	30
Jummanobanahalli	57 B/10	14 39 15	76 32	20-25
Kakabalu	57 A/12	15 13	76 31 30	25-30
Kodal	"	15 7 30	76 41	10-20
Kurikuppi	"	15 13	76 39	10
Lokikere	57 B/10	14 37 30	76 30	10-20
Nagalapuram	57 A/12	15 9	76 36 30	10-15
Nagavanahalli	57 B/9	14 57 30	76 39	about 30
Pujarihalli	57 B/10	14 36 30	76 32	10-20
Ramadurgam	57 B/9	14 51	76 33	20
Sheliyappanahalli	"	14 54	76 38	15-20 (along the stream course)
Shidegallu	"	14 48	76 35	20-25 15 along stream
Srikantapuram	"	14 50	76 35 15	15
Suntanapuram	57 A/12	15 9 30	76 42 30	10-15
Swamihalli	57 B/9	14 58	76 37	25-30
Talur	57 A/12	15 10	76 36 30	10
Toranagallu	"	15 12	76 40 35	15-25
Tumbaraguddi	57 B/9	14 57	76 35	10-15
Vaddu	57 A/12	15 11	76 38	20-25